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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,426	04/05/2005	Haruhiko Habuta	10873.1642USWO	6696

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EXAMINER	
HIGGINS, GERARD T	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
01/21/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,426	HABUTA ET AL.	
	Examiner	Art Unit	
	GERARD T. HIGGINS	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/29/2008 has been entered.

Response to Amendment

2. Applicant's amendment filed 12/02/2008 and 12/29/2008 has been entered. Currently claims 1-7 are pending and claims 8-11 are cancelled.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claims 1, 2, 6, and 7, the term "low" is a relative term which renders the claim indefinite. The term "low" is not defined by the claim, the specification

does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what refractive indices are considered to be low.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishihara et al. (US 2002/0054983) as evidenced by Nishihara et al. (US 2004/0105182).

With regard to claims 1, 6, and 7, Nishihara et al. disclose the optical recording medium of Figure 1.

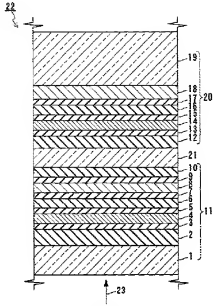

Fig. 1

The medium is comprised of a first substrate **1**, which reads on applicants' substrate, first **11** and second **20** information layers, which read on applicants' plurality of information layers, and an optical separating layer **21** being provided between the information layers [0055], which reads on applicants' first optical separating layer. The first information layer **11** is on the laser beam incident side **23** [0055], thereby defining said first information layer and first optical separating layer to be in the same position as claimed by applicants. In the first information layer there is a recording layer **4** comprised of phase-change material [0067], which reads on applicants' limitation that the recording layer can change between two optically different states (i.e. amorphous and crystalline). There is a transmittance adjusting layer **10** that may be comprised of TiO_2 [0062] and [0065]. Nishihara et al. also disclose protective layers **2** and **6** that may be comprised of dielectrics such as SiO_2, Al_2O_3, and ZrO_2 [0062], which are low

refractive index materials; however, Nishihara et al. fail to disclose that there is a protective layer disposed in between the transmittance adjusting layer and the first optical separating layer.

Nishihara et al. disclose the use of the protective layers at [0062], wherein they state that the protective layers "serve to adjust the optical distance so as to raise the optical absorption efficiency of the recording layer, and to increase a change in the amount of reflected light before and after recording so as to increase the signal amplitude."

It would have been obvious to one having ordinary skill in the art to perform a mere duplication of a protective layer and place it anywhere in the recording stack, including between the transmittance adjusting layer and the first optical separating layer as claimed, in order to adjust the optical distance so as to raise the optical absorption efficiency of the recording layer, and to increase a change in the amount of reflected light before and after recording so as to increase the signal amplitude. These principles are taught by Nishihara et al.; furthermore, one of ordinary skill would understand that dielectric layers are ubiquitous in the field of optical recording media, and it would have been obvious to place dielectric layers for the motivation provided above or for the purpose of protecting the migration of materials into and out of the various layers.

Likewise with specific regard to claim 7, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the thickness of this protective layer to be any amount, including those claimed, in order to arrive at a protective layer that achieved the goals mentioned above.

With regard to claims 2 and 3, the protective layer (low refractive index layer) and the optical separating layer of Nishihara et al. are made of the same preferred materials as is used applicants (i.e. SiO_2 and polycarbonate/PMMA) [0059]. These materials will intrinsically satisfy the equations of claims 2 and 3; furthermore, it would have been obvious to have satisfied these equations because when the refractive indices of two layers are close to one another (or matched) that will provide less scattering of light at the intersection of the layers.

With regard to claim 4, Nishihara et al. disclose that the recording layer is comprised of phase change material [0067], and they also disclose that the transmittance of said recording layer in both the amorphous and crystalline phase is increased such that $(T_a + T_c)/2$ is greater than or equal to 45 % [0026]. This includes possibilities where both T_c and T_a are greater than 45 %, which reads on the equation of applicants' claim 4.

With regard to claim 5, Nishihara et al. disclose a reflective layer **8** in between the recording layer and the transmittance adjusting layer, wherein the reflective layer may comprise silver [0080]. Given that the transmittance adjusting layer may be made of TiO_2 as stated above and that the reflective layer **8** may be comprised of silver, it is evidenced from Nishihara et al. (US 2004/0105182 at [0068]) that these materials will intrinsically satisfy the equations of applicants' claim 5.

7. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishihara et al. (WO 03/025922), of which US 2004/0105182 is the US national stage entry and will be used herein as a translation.

With regard to claims 1, 6, and 7, Nishihara et al. disclose the optical recording medium of Figure 1.

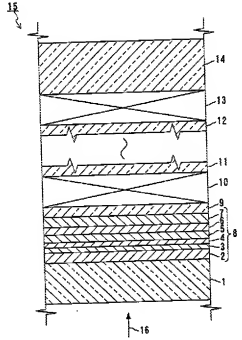

Fig. 1

The medium is comprised of a transparent layer **1**, which reads on applicants' substrate, first **8** and second **10** information layers, which read on applicants' plurality of information layers, and an optical separating layer **9** being provided between the information layers [0037], which reads on applicants' first optical separating layer. The first information layer **8** is on the laser beam incident side **16** [0039], thereby defining said first information layer and first optical separating layer to be in the same position as

claimed by applicants. In the first information layer there is a recording layer **4** comprised of phase-change material [0042] and [0058], which reads on applicants' limitation that the recording layer can change between two optically different states (i.e. amorphous and crystalline). There is a transmittance adjusting layer **7** that may be comprised of TiO_2 [0042] and [0054]. Nishihara et al. also disclose protective layers **2** and **5** that may be comprised of dielectrics such as SiO_2, Al_2O_3, and ZrO_2, which are low refractive index materials [0046] and [0049]; however, Nishihara et al. fail to disclose that there is a protective layer disposed in between the transmittance adjusting layer and the first optical separating layer.

Nishihara et al. disclose the use of the protective layers at [0047] and [0049], wherein they state that the protective layers adjust the "optical distance to enhance a light absorption of the recording layer **4** and increas[e] a change in an amount of reflected light before and after recording to enlarge a signal amplitude."

It would have been obvious to one having ordinary skill in the art to perform a mere duplication of a protective layer and place it anywhere in the recording stack, including between the transmittance adjusting layer and the first optical separating layer as claimed, in order to adjust the optical distance so as to raise the optical absorption efficiency of the recording layer, and to increase a change in the amount of reflected light before and after recording so as to increase the signal amplitude. These principles are taught by Nishihara et al.; furthermore, one of ordinary skill would understand that dielectric layers are ubiquitous in the field of optical recording media, and it would have

been obvious to place dielectric layers for the motivation provided above or for the purpose of protecting the migration of materials into and out of the various layers.

Likewise with specific regard to claim 7, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the thickness of this protective layer to be any amount, including those claimed, in order to arrive at a protective layer that achieved the goals mentioned above.

With regard to claims 2 and 3, the protective layer (low refractive index layer) and the optical separating layer of Nishihara et al. are made of the same preferred materials as is used applicants (i.e. SiO_2 and polycarbonate/PMMA) [0054] and [0038]. These materials will intrinsically satisfy the equations of claims 2 and 3; furthermore, it would have been obvious to have satisfied these equations because when the refractive indices of two layers are close to one another (or matched) that will provide less scattering of light at the intersection of the layers.

With regard to claim 4, Nishihara et al. disclose that the recording layer is comprised of phase change material [0058], and they also disclose that the transmittance of said recording layer in both the amorphous and crystalline phase is increased such that both T_c and T_a are greater than 46 %, which reads on the equation of applicants' claim 4 [0071].

With regard to claim 5, Nishihara et al. disclose a reflective layer **6** in between the recording layer and the transmittance adjusting layer [0042], wherein the reflective layer may comprise silver [0065]. These materials will intrinsically satisfy the equations

of applicants' claim 5; furthermore, Nishihara et al. also disclose the formulas of applicants' claim 5 at [0068], which overlap will applicants' claimed formulas.

Response to Arguments

8. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

The crux of this case revolves around the placement of a dielectric layer in between the transmittance adjusting layer and the optical separation layer. It is clear to the Examiner that optical separation layers and transmittance adjusting layers are known to be used with phase change optical recording media. A transmittance adjusting layer is in itself a dielectric layer, duplicating one of the other protective/dielectric layers in the disc would have been obvious to one having ordinary skill in the art as either action would comprise a mere duplication of parts. The motivation for adding dielectric protective layers is to adjust heat absorption and mobility of atoms, and also to effectuate the least amount of scattering of laser light at the interfaces of each of the layers, and thereby preserve the largest transmittance to further recording layers.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Examiner has cited an example of a transmittance varying layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GERARD T. HIGGINS whose telephone number is (571)270-3467. The examiner can normally be reached on M-F 9:30am-7pm est. (1st Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gerard T Higgins
Examiner
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